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ON CERTAIN ANCIENT ERRORS IN GEOGRAPHICAL ORIENTATION

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The schoolboy of my childhood, who after a spoon-diet of comminuted and predigested sentences was plunged into Caesar's *Gallic War* for his first solid Latin pabulum, found himself confronted in the initial chapter with somewhat of a geographical puzzle. Caesar appeared to say (though in decidedly curious manner) that the central of the three divisions of Gaul lay to the northward of the Rhone territory, and was flanked on the right by the land of the Belgae, which stretched to the northeast, and on the left by Aquitania, which was situated to the northwest. The schoolmaster doubtless informed the youngster, in accordance with the sole remark of the wisest commentators of the day, that Caesar was speaking from an assumed standpoint in the Province. That was well enough; but even so, the map showed that the Belgae were planted more nearly north of the Province, the Celtae northwest, and the Aquitani west. But as no further explanation was forthcoming, the schoolboy usually classed his puzzle as one of the unreasonable curiosities of Latin expression, and thought nothing more of it. If he had waited till a later time, he would have found certain wise men to assure him that Caesar himself never wrote such Latin as that in the last three sections of the first chapter; but they would have proffered him no further help as to the concept of the pseudo-Caesar who did write them. Nor would the editors who, apparently with some sense of a manifest difficulty, have tried to explain the statement as pertaining to drainage areas, watersheds, and the like, have afforded him much satisfaction.

With further reading other problems of similar unexplained character confronted him. For example, Caesar's description of Britain (*B.G.* v. 13) was hard to understand. The island is said

to be triangular in shape, with one side parallel to the coast of Gaul; and of this side one extremity is declared to lie toward the east, the other toward the south. That might pass; but the length of the side is given as *circiter milia passuum quingenta*, which is far too great, and furthermore the second side of the island *qua ex parte est Hibernia* is said to stretch toward Spain and the west (*alterum uergit ad Hispaniam atque occidentem solem*). That statement is certainly on its face difficult to comprehend. If that extremity of this second side which meets the first is meant, that angle has already been affirmed to lie to the southward (*inferior* [sc. *angulus*] *ad meridiem spectat*); if the other end of the second side is meant, the implication is of an obtuse angle at the point of junction, a protraction of the second side of Britain in practically an east-west direction, and the extension of Spain far out into the Atlantic, so that the westernmost extremity of the second side shall lie opposite that country, and presumably therefore not far removed from it by intervening waters. We must, however, conceive Ireland as lying between the somewhat parallel coasts of Britain on the north side and Gaul-Spain on the south. Later critics have assigned this passage also to the same pseudo-Caesar who is alleged to have written *B.G.* i. 1. 5-7, but at all events his meaning sorely needs explanation.

Yet Caesar, or the pseudo-Caesar, is not the only ancient writer who puts Spain opposite Britain, and also apparently thinks of their respective coasts as substantially parallel, taking no account, one may infer, of the great indentation of the Bay of Biscay, nor of the projection of Brittany, but regarding the Spanish and Gallic shores as continuous in the same straight line. To Strabo, for example, Britain is triangular in shape, with its longest side parallel to the Gallic coast and extending from a point opposite the mouth of the Rhine to the heights of the Pyrenees beyond Aquitania. He furthermore appears to conceive these parallel coasts as running in an east-west direction, but places Ireland to the north of Britain, as do also some other writers (e.g., Mela iii. 53): cf. Strab. 199 f.: Ἡ δὲ Βρεττανικὴ τρίγωνος μὲν ἐστὶ τῷ σχήματι, παραβέβληται δὲ τὸ μέγιστον αὐτῆς πλευρὸν τῇ Κελτικῇ . . . τὸ ἀπὸ Καντίου τοῦ καταντικρὺ τῶν ἐκβολῶν τοῦ Ῥήνου . . . μεχρὶ πρὸς τὸ ἐσπέριον ἄκρον τῆς

νήσου τὸ κατὰ τὴν Ἀκυτανίαν καὶ τὴν Πυρρήνην ἀντικείμενον. . . . ἡ Ἰέρνη πρὸς ἄρκτον αὐτῇ [sc. τῇ Βρεττανικῇ] παραβεβλημένη. Appian also apparently thought of Britain as extending to a point opposite and near to Spain, for he affirms (Ἰβηρ. 1) that the Spaniards take advantage of the tidal currents to cross into Britain, accomplishing the journey in half a day! He must accordingly have thought of Ireland as lying to the north of Britain instead of to the south. The elder Pliny shows much better and more detailed knowledge of Britain than does Caesar (or the pseudo-Caesar), but he also says that Britain lies opposite Germany, Gaul, and Spain (*N.H.* iv. 102: *Britannia . . . inter septentrionem et occidentem iacet, Germaniae, Galliae, Hispaniae . . . aduersa*). As regards the shape of Britain, Tacitus is better informed than his predecessors: he has learned from the campaigns of Agricola that the triangular form assigned to the island hardly corresponds to the fact, though it is more nearly true of Britain proper, while Caledonia stretches as an addition far northward, and tapers away to a wedge-like form (*Agr.* 10). But he also speaks of Britain as lying opposite Germany, Gaul, and Spain, and also makes the parallel coast lines run east-west (*Agr.* 10: *Britannia . . . in orientem Germaniae in occidentem Hispaniae obtenditur, Gallis in meridiem etiam inspicitur; II posita contra Hispania* [i.e., *contra Silures*]). He definitely states, what is reasonably inferred from *Caes. B.G.* v. 13. 2, that Ireland lies between Britain and Spain (*Agr.* 24: *Hibernia medio inter Britanniam atque Hispaniam sita*). Orosius presents the same view as Tacitus regarding the situation of Britain and Ireland (*Adu. Pag.* i. 2. 75 f.: *insulas quae Britanniam et Hiberniam uocant, quae in auersa Galliarum parte ad prospectum Hispaniae sitae sunt . . . Britannia oceani insula per longam in Boream extenditur; a meridie Gallias habet . . . Hibernia insula inter Britanniam et Hispaniam sita . . .*).

But it is unnecessary to multiply examples of ancient descriptions of Britain. One or two of other localities may be mentioned.

Polybius prides himself on the accuracy of his geographical knowledge, and censures other writers for their carelessness and ignorance in that field. When describing the march of Hannibal from the Rhone into Italy, he takes occasion to inform us (iii. 48 *fin.*)

that he had himself examined the region, and even crossed the Alps by Hannibal's route in order to assure himself of the truth by his own eyes. Yet he declares that Hannibal after his passage of the Rhone marched up the river eastward as if bound for the central region of Europe (iii. 47: *παρὰ τὸν ποταμὸν ἀπὸ θαλάττης ὡς ἐπὶ τὴν ἑω, ποιούμενος τὴν πορείαν ὡς εἰς τὴν μεσόγαίον τῆς Εὐρώπης*). That this is no slip of the pen is made evident by his more formal statement of the topography of the region. Italy, he tells us (ii. 14), is triangular in shape,¹ bounded on the east by the Ionian Sea and the Adriatic Gulf, on the south and west by the Sicilian and Tyrrhene seas. The base of the triangle is formed by the limiting range of the Alps, which stretches across (2,200 stadia) from "the neighborhood of Marseilles" to a short distance from the head of the Adriatic. Polybius certainly regarded the Alps as extending from west to east in substantially a straight line (cf. also his description of the triangular shape of the Po valley), instead of curving up far northward. The Rhone, he declares (iii. 47), rises among the heights on the northern slope of the Alps, and flows a little south of west to the Sardinian Sea (*ὁ δὲ Ῥοδανὸς ἔχει τὰς μὲν πηγὰς . . . ἐν τοῖς ἀποκλίνουσι μέρεσι τῶν Ἀλπεων ὡς πρὸς τὰς ἄρκτους, ῥεῖ δὲ πρὸς δύσεις χειμερινάς, ἐκβάλλει δ' εἰς τὸ Σαρδῶν πέλαγος*). On its north bank dwells the Keltic tribe of the Ardyes; its south bank is flanked all the way by the northern foothills of the Alps (*ibid.*).

One might reasonably suppose that Tacitus must have been personally acquainted with the topography of the island of Capri, but thus he describes it (*Ann.* iv. 67): *Caeli temperies hieme mitis obiectu montis, quo saeva uentorum arcentur; aestas in Fauonium obuersa et aperta circum pelago peramoena*. This would seem to indicate that to his mind the longer axis of the island lay in a north-south direction, so that the main settlement, which doubtless in his day, as in ours, was situated on the saddle between the heights that rise at either end of the island, was sheltered from the cold northern blasts of winter by the barrier of the mountain above Anacapri, while it enjoyed a tempered summer climate by reason of looking out westward over the open sea. But as a fact the

¹ Other ancient geographers represent the Italian peninsula as much broader in proportion at the north than it really is.

island lies east-west, the village has a southern instead of a western exposure, and its delightful climate must be explained otherwise than as Tacitus affirms.

These will serve as samples of a certain sort of the curiosities of geography that abound in classical authors. In attempting to account for these, I shall incidentally be pointing out the principles on which many other statements like them may become more explicable.

The catalogue of ancient writers who devoted their especial energy to the advancement of geographical knowledge is long and honorable. The names of the more important men are well known and frequently cited. Hecataeus, writing in the sixth century before Christ, may be regarded as the first of the list. Then follow Herodotus and Hanno (fifth century), Ephorus, Megasthenes, Pytheas, and Dicaearchus (fourth century), Timaeus and Eratosthenes (third century), Hipparchus and Polybius (second century), Artemidorus (second-first century), Posidonius (first century before Christ), Strabo (first century after Christ), Pomponius Mela (writing under Claudius), Marinus Tyrius (second century); and the list culminates in Claudius Ptolemy (middle of the second century), whose great work on geography was the standard of the later ages down into the period of the Renaissance, unless perhaps in Byzantium, where Strabo retained his great popularity. The original works of many of these authors have disappeared, and our knowledge of them must be restored from extracts and references in the pages of their successors. Nowhere more than in this field, where later writers of necessity repeated in considerable measure, as we do at the present day, the statements of their predecessors, but added to and corrected them by the help of more recent material, is it of importance to analyze the work of each man, and to determine his sources and the extent and value of his independent contributions to the general fund of knowledge.

But in addition to this it is of especial moment, in my judgment, to recognize that in the course of time a sort of geographic tradition naturally tends to establish itself, and to exercise a powerful though not strictly defined influence upon each successive geographer, as well as upon popular ideas. No one man can be

expected to verify the entire data and conclusions of his predecessors in the field. His own new material will prompt and enable him to modify or elaborate this or that division of earlier work, but not to construct altogether a new world. The geographic tradition is forever present with its conservatizing pressure, acting as a brake on revolutionary tendencies, holding back the unconscious mind of the investigator from pursuing to the final logical outcome even the indications that lie ready before him. We must expect to find in geographical statements, even after exploration and investigation are relatively far advanced, many incongruities and absurdities that appear, and are, quite out of harmony with the general equipment of the writer in whose works they exist.¹ They naturally attract our attention, but need not arouse our wonder: they are due to the persistence of the geographic tradition.

Another element of great importance, as it seems to me, in its influence on the geographic tradition has apparently not received the attention it deserves; I mean the use of maps by the ancients independently of geographical treatises. Unfortunately, the information on which we might depend for certain conclusions on the matter is extremely scanty. Anaximander (610-547 B.C.), the pupil and successor of Thales, introducer if not inventor of the *gnomon*, which remained for many centuries practically the geographer's sole instrument for determining terrestrial latitudes, is reputed to have been the first man to publish a plan of the earth's surface. A map of the world engraved on a plate of bronze was used at Sparta about 500 B.C. It was said by Herodotus (v. 49) to exhibit *γῆς ἀπάσης περιόδος καὶ θάλασσά τε πᾶσα καὶ ποταμοὶ πάντες*. This may have been a copy of Anaximander's map. Maps of the world were certainly not uncommon in the time of Herodotus (iv. 36: *ὁρέων γῆς περιόδους γράψαντας πολλοὺς ἤδη*), and the manner

¹ Meusel (*Jahresb. d. Philol. Ver.*, 1910) insists that Caesar, having been resident in Gaul for years, and having traversed it far in every direction, could not possibly have been guilty of such false orientation as that in *B.G.* i. 1. 5-7. The point appears to me not well taken. Other writers blundered even worse than this about topographical matter upon which it might be reasonably certain that they were well informed; and it is precisely such problems of general orientation of larger regions that are the most readily subject to error, in the lack of triangulation methods. Caesar was not wise above all other men. But there are sufficient other reasons for judging the passage in question to be an interpolation of much later date.

of his criticism of them indicates that in general they embodied an already established geographic tradition. A map was introduced on the stage in the *Clouds* of Aristophanes (vss. 206 ff.), not at all as a device strange to the audience, but as a well-known aid to instruction. A geographic tradition is clearly recognized by Eratosthenes, who distinctly set out to revise the map of the world (Strab. ii. 1. 2, C 68: οἶεται δεῖν διωρθῶσαι τὸν ἀρχαῖον γεωγραφικὸν πίνακα). In the later time of the Roman republic, and throughout the imperial period and world, maps were such commonplace affairs that citation of authorities is unnecessary. They were used in instruction, they were held in private possession, they were displayed in public buildings.

Ptolemy had a series of maps prepared to accompany his work on geography, and it is held by some that his treatise ought rather to be regarded as a commentary on his maps than his maps mere illustrations of his treatise. It is possible—perhaps probable—that the maps preserved to the present day in company with the text of Ptolemy are in unbroken descent from those he himself mentions; but if they are so, they are the only maps of any one of the geographers I have enumerated to come down to us. The maps of the world according to Hecataeus, Herodotus, and the rest are modern restorations constructed from the treatises of the writers concerned, when these are extant, or, in the case of geographers whose works have vanished, from extracts and references preserved in later writers. The maps are true, then, only to a somewhat limited degree, varying according to the fulness of our information.

But that the ordinary source of geographical knowledge in ancient days was such maps, and not the learned treatises of specialists, would certainly appear most likely. Indeed, in some instances it would look as if even the specialist used his predecessor's map as the basis for his own study, and turned to the wearisome treatise for statistics only when he could hardly avoid it. And it should be observed that the popularization of geographical maps independently of the learned treatises must have been a very decided influence in the conserving of the geographic tradition. Few men would think of revising the maps in their possession in view of the reports from a recent campaign or the stories of a

returned trader or explorer. (Few of us, I dare say, have entered in our own most-used atlas the "River of Doubt.") Thus "old editions" would continue to be in use, old ideas would still be handed on, and such new facts as might force themselves upon the attention would merely be fitted into the old scheme in any ready offhand manner. And doubtless in ancient as in modern days many persons, otherwise intelligent, found it impossible to gain a true topographic knowledge from either book or map, and had to fall back on oral questioning of the better informed, chiefly about itinerary distances, the course of rivers, and the like, and upon autopsy. There has been, I fear, too great a tendency to treat the incidental chapters or statements on geography in a historian, for example, as if they must be due to the following of this or that special authority, whereas they may have been dependent merely upon the current geographic tradition, or upon some current map. The latter, of course, like the former, must ultimately date back to some more authentic source, but may have departed unwittingly quite a distance from it. We surely need not be "wiser than the ancients."

As regards latitudes, it may be remarked that they could be computed with some degree of exactness at places where a competent observer equipped with a *gnomon* was present, but the determination of longitudes by observational methods was unknown. Chief reliance had to be placed on reports of itinerary distances of one place from another, and these were most assiduously collected. When such material became abundant, a rude sort of triangulation from point to point must have been possible; but the mischief was that the reports of distances between given places differed to a marvelous degree. Of this disagreement many instances are recorded. In general the geographic tradition made "the inhabited earth" much more narrow from north to south than it really was in proportion to its alleged and plotted extension from east to west.¹ I have even imagined that the persistence of this tradition of a great east-west elongation of the map had some influence upon the

¹ Of course the terms "latitude" and "longitude" retain in our day the sole remaining trace of this concept. The influence on Columbus of the ancient exaggeration of the eastern longitude of India will be remembered.

curious construction of the archetype of the Peutinger Table, which plots the roads and stations of the Roman Empire within the encircling ocean on a broad horizontal ribbon more than twenty times as long as it is wide.

But however this may be, the result of the ancient tradition of very excessive relative elongation of the map from east to west upon the depiction of the western part of Europe (with which alone I am now concerned) is readily evident. The coast line of Germany-Gaul-Spain, which I have said above (pp. 89 f.) appears to have been early considered to be substantially a straight line,¹ was drawn into a much more east-west prolongation than the reality justifies, and Spain was thrust out much farther westward than it actually lies. That tends to give to the parallel coasts of Britain to the north and Gaul-Spain-Germany to the south the east-west orientation they hold in certain of the writers that I have cited above (p. 92). The method of projection commonly employed (that later styled Mercator's) may have contributed to this configuration.

As regards the prodigious extension of the coast line of Britain opposite the continent, I am inclined to think that this is to be explained, not entirely as merely another example of the great exaggeration of distances in a little-known region (of which copious instances can be cited), but as due to an early confusion about the shape of the island, which left its trace thus in the report (and consequent plotting) of this dimension. The form seems to have been considered as long and narrow, coming to a point at the eastern and western extremities. The eastern end (Cantium), being nearest to the mainland, became known much earlier than the western. In some way in the reports of distances (which the geographers always collected with great avidity) the southern and western sides, I conceive, were added together, and understood to lie in substantially the same line. Britain, therefore, having its eastern extremity determined as opposite the mouth of the Rhine, must

¹ If Strabo had not disbelieved Pytheas, he might have saved himself from the perpetuation of this error: for Pytheas observed the deep recession of the Bay of Biscay, and the projection of Brittany. Polybius also thought Pytheas a manifest liar about his voyage to Britain. It is a great pity that the book which Polybius himself devoted to a description of the geography of Europe has not been preserved.

be plotted as stretching far out opposite Spain; and the concept once formed persisted, even after the triangular shape of the island (which Pytheas reported from his own voyage of exploration) was established, and its position to the northwest of Gaul instead of the north determined. This misapprehension will also explain why Ireland is represented by some writers as lying between the south coast of Britain and Spain, while others, who had evidently learned something about the Cornwall end of the island, but were still not free from the earlier tradition of shape in other respects, place it to the north of Britain. That is, they were truly informed that Ireland lay opposite, not the south coast of Britain, but the adjacent side as one proceeds westward; but as they still clung to the concept of a long and narrow Britain stretching east-west, they naturally placed Ireland to the north of the larger island.¹ Even Eratosthenes, though he notes the Cantium end of the island as a sort of dividing projection, does not follow Pytheas as closely as he might well have done, but apparently regards the island as long and narrow. We are left in ignorance of what Pytheas and Eratosthenes thought about the position of Ireland.

But no ancient geographical treatise, and no map reconstructed from such a source, accounts directly for the statement about the course of the Rhone that I have quoted from Polybius (p. 91; I have already said that his own book on the geography of Europe is not extant). I therefore venture another explanation, following the idea that appears to me reasonable that maps rather than extensive special treatises were the source of many of the statements about geographical matters made by ancient writers who were not by profession geographers, and occasionally even by some who were. I have already indicated that Polybius thought of the Alps as crossing in a straight line from "the neighborhood of Marseilles" to the head of the Adriatic. If in addition to this the map that lay before Polybius were so orientated that the main axis of Italy was regarded as running north-south, his error about the direction of the Rhone's course would be satisfactorily accounted

¹ Ptolemy, with all his increased knowledge and more critical judgment, apparently had not freed himself entirely from this tradition, for he plants Ireland much too far north with respect to Britain.

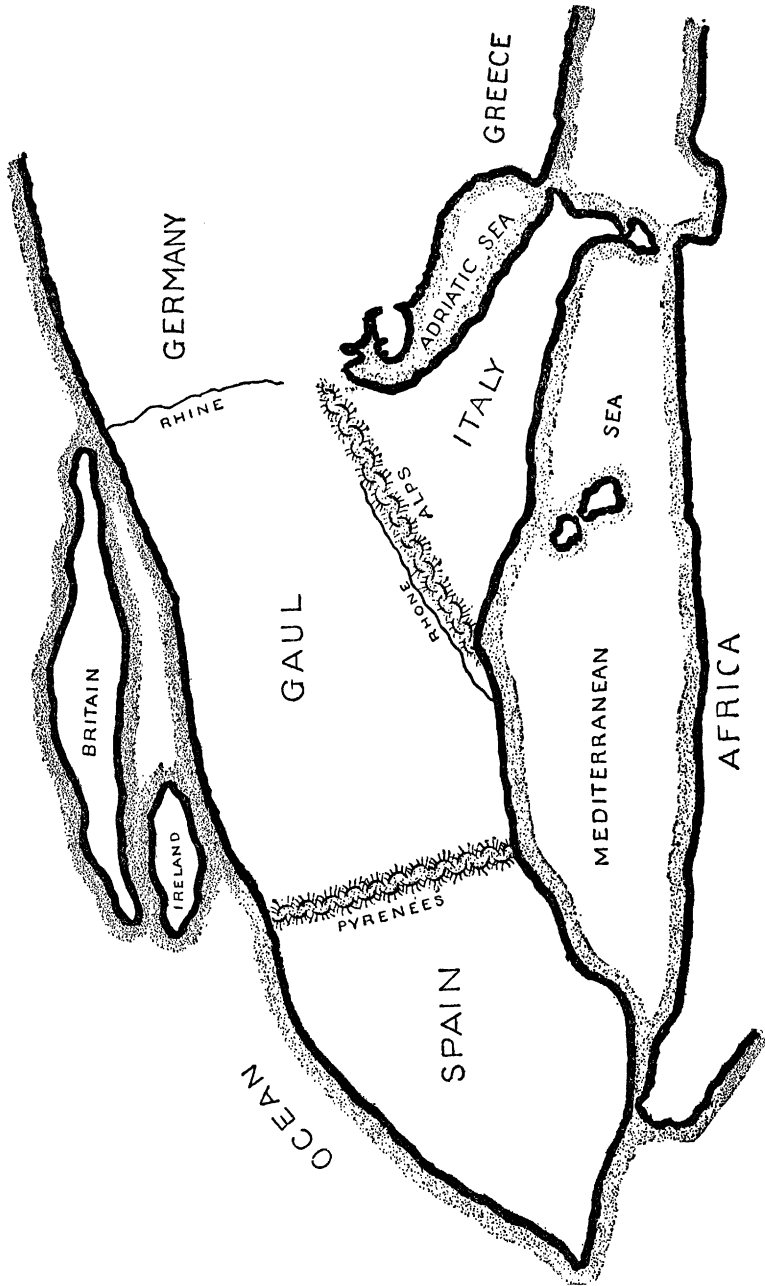
for. Or if Polybius had before him such a map as I have reconstructed to illustrate this essay, his statement about the direction of the course of the Rhone might be regarded as conforming closely enough to its indications to make it unnecessary to suppose that he used a wrongly orientated map of Italy or of Europe. To be sure, his own travels in the region ought to have enabled him to correct even his map; but they evidently did not, and perhaps that is too much to expect of any ancient writer. I have known many very intelligent people nowadays who have not the slightest "topographic sense," even with a map and the landscape before their eyes.

But to turn to the Caesar passages: H. Meusel very properly pointed out (*Jahresb. d. Phil. Ver.*, 1910) that in *B.G.* i. 1. 5-7, Caesar, writing for Romans, would naturally be expected to give the orientation of the main divisions of Gaul from the standpoint of Italy; but Meusel uses the objection only to assist in his destruction of faith in the authorship by Caesar of the passage in question: A. Klotz essays an explanation in his *Cäsarstudien* (Leipzig: Teubner, 1910). He calls up from the vasty deep of forgotten years the unsubstantial spirit of a certain Timagenes, materializes him into solid form, and makes him one of the chief sources of Strabo, whom he could not have preceded far in time. Now Strabo (and therefore Timagenes) clearly states that the Pyrenees run north and south, and describes Aquitania as bounded on the west by the Pyrenees, on the north by the ocean: therefore the pseudo-Caesar, whom Klotz believes to have followed Timagenes, says that Aquitania *spectat inter occasum solis et septentriones*. Similarly Celtica, which has as its main boundary the ocean on the north, *uergit ad septentriones*; and to the adjacent Belgica is left the northeast. This may be the right explanation; but there are various difficulties connected with it which I must not take space to discuss. I would merely suggest that if the pseudo-Caesar had a map before him orientated like the one that I have conjectured as a possible foundation for the error cited from Polybius—a map with the main axis of Italy lying in what was taken to be a north-south line—and especially if it showed the traditional flattening down toward the east-west lineal of the coast line of Germany-Gaul-

Spain, his statement of general direction would be accurate enough from the standpoint of central Italy, and no citation of Timagenes would be necessary in order to enable the reader to comprehend it. Or if he used such a map as the one I have sketched herewith to illustrate "the early geographic tradition," we might consider his statement of the relative direction of the three divisions of Gaul entirely justifiable, whether he was speaking from an assumed standpoint in Italy or in the Province.

With regard to the description of Britain in *B.G.* v. 13, I think it very evident that the pseudo-Caesar has jumbled together two discrepant accounts; the earlier, that represents Britain as long and narrow, extending east-west from the mouth of the Rhine to the Pyrenees, with Ireland lying between it and Spain, and the later and truer, that depicts Britain as a triangle, lying to the northwest of Gaul, with its nearer coast running somewhat northeast-southwest, so that its Cantium angle points east, and the Cornwall angle south. Here is another example of the persistence of an earlier geographic tradition that an unintelligent student attempts to combine with later discoveries, instead of rejecting the first absolutely. Whether so shrewd a scholar as Caesar could have been guilty of such an impossible mixture as this, I am inclined to doubt. It may be that here is another geographic argument for condemning the passage concerned as an interpolation.

Ptolemy has a curious error in his orientation of Scotland, quite out of harmony with the precision of his knowledge of the country in other respects. He joins it on to England at a decided angle, bending it far over to the eastward. Mr. Henry Bradley ("Ptolemy's Geography of the British Isles," *Archaeologia*, XVIII [1885]) accounted for this on the supposition that Ptolemy, or his predecessor, used a separate map of Scotland, and in combining it with the map of England on the general chart mistook the orientation by a quadrant. I imagine that a similar sort of error may account for the perversion by Tacitus of the orientation of the island of Capri (cf. p. 91). Whether he had himself ever set foot upon the island, or was depending on a sketch made for him on the authority of some other person, it is impossible to decide. Even if he had visited the place, it is not at all



Sketch-map of Western Europe to illustrate the early geographic tradition

inconceivable that he might later have erred concerning its position. Modern visitors are often inclined to think that Capri lies much more nearly north-south than is actually the case, and its true orientation is not readily discernible from all parts of the mainland. If his sketch were drawn, as was perfectly natural, with the longer axis of the island coincident with the longer axis of the tablet or sheet of paper on which it was depicted, he might easily later have taken the "top of the page" to be the north end, and have expressed himself accordingly. It must be remembered that the ancients, especially in the case of local maps of limited areas, had no such rigid rule of uniform and exact orientation as prevails in modern days (witness the varying orientation of mediæval maps of the city of Rome, and therefore presumably of their ancient prototypes: the ancient *Forma Urbis Romæ*—the "Marble Plan"—certainly did not have north at the top).

Of course it is conceivable that Tacitus used a map of Italy and the adjacent islands like that the possibility of which I have conjectured above (p. 97), and that the orientation of this, with other possible lack of accuracy in it, contributed to, or was even responsible for, his error.¹

¹ The accompanying sketch-map is not drawn according to the data supplied by any single ancient geographer. It is rather a sort of composite picture, and aims to represent in general outline the configuration of Western Europe somewhat as it must have been depicted in popular maps of the last two or three centuries before Christ, and perhaps even later. Numerous early known details, such as the course of the Apennines and Cevennes, of certain rivers, and the position of sundry islands and towns, are omitted because not directly illustrative of matters treated in the text of the essay.